International Scholars Journals

International Journal of Agricultural Sciences ISSN 2167-0447 Vol. 7 (5), pp. 1317-1322, May, 2017. Available online at www.internationalscholarsjournals.org © International Scholars Journals



*Full Length Research Paper*

# Cost and return analysis of blackgram in Lalitpur District of Uttar Pradesh

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Accepted 25 April, 2017

**The study was conducted in four development blocks of Lalitpur district during the agricultural year 2014-15. Five villages from each block were selected randomly. Further, from each village 15 farmers were selected randomly so as to constitute a total sample size of 300. Primary data on cost and return of blackgram were collected by interviewing the farmers with the help of specially structured and pre-tested schedule. For computation of costs and returns, the concept framed by CACP was used. In the study per hectare cost of blackgram was highest in semi-medium size category of farms. This was lowest in large size category of farms. Irrespective of size categories i.e., for all farms cost per hectare was Rs. 27779.31. The gross return per hectare of all farms was Rs. 41535.04. The Benefit Cost Ratio (BCR) was highest in case of marginal farms and it was found to be 1.54, followed by 1.52, 1.51 1.48, and 1.45 in medium, large, small, and semi-medium farms respectively. This gradual decrease in BCR could be explained in terms of declining gross return across the higher size categories of farms. However, for all farms BCR was 1.49.**

**Keyword:** Simple random sampling without replacement, cost concept, CACP, yield, gross return, net return and benefit cost ratio (BCR).

## INTRODUCTION

Agricultural sector is the backbone of Indian economy providing employment to 52-58 per cent (Census 2011) of the total population and contributes about 14.20 percent of Gross Domestic Product (GDP) (Economic Survey 2010-2011). The agricultural sector continues to be essential for food production with growing population. A large part of the export earnings comes from agricultural sector. Therefore, an impressive growth in agricultural sector is necessary to increase food availability and sustain the economic development process continuously. The Ministry of Agriculture has long emphasized on the production of agriculture in general and pulse production in particular to meet the nutritional requirement of vegetarian masses.

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India is the largest producer as well as consumer of pulses. Being the largest pulse producer in the world, India has been importing 3-4 MT of pulse every year to meet its domestic demand. India achieved a record output in pulse production to 19.25 MT in 2013-14 with the highest production in blackgram (urad) recorded as 1.95 MT in 2014-15. India is the largest producer as well as consumer of blackgram. It produced 1.95 MT of urad from 2.52 M ha. of area in the year of 2014-15 (Ministry of Agriculture and Farmer welfare). Blackgram production in India is largely concentrated in five states viz, Uttar Pradesh (UP), Andhra Pradesh, Maharashtra, Madhya Pradesh and Tamil Nadu. These five states together contribute about 65% of the total blackgram production in the country. There is a distinct change in production pattern of blackgram across the states. As per the available estimates, UP and Andhra Pradesh occupy the first two positions, contributing over 40% of the total

production. Maharashtra contributes about 14% while Tamil Nadu and Madhya Pradesh account for about 10% and 8.5% respectively of the total production in the country. In Uttar Pradesh the largest area to the extent of 160879 ha. (28.13 %) is covered by Lalitpur district and this also makes the highest contribution in the production of the state. This is about 124355 tonnes (32.72 %) of the total production in the year of 2012-13 (Ministry of Agriculture, GOI, 2013-14).

## MATERIALS AND METHODS

The present study was conducted in 4 blocks of Lalitpur district. Birdha block, Mahrauni block, Bar block and Jakhaura block were purposively selected from the district. These blocks were chosen specifically because these blocks covered a large chunk of area under blackgram cultivation than other blocks growing blackgram in the region. From each block 5 villages were randomly selected for the purpose of the study. Fifteen farms were randomly selected from each village. Then a sample of 300 farmers was selected randomly following the technique of Simple Random Sampling Without Replacement. The farms were categorized into five groups viz, marginal (below 1 ha.), small (1-2 ha.), semi-medium (2-4 ha.), medium (4-10 ha.) and large (≥ 10 ha.). Required data from sample farmers were collected through a pre-tested schedule by personal interview method. Tabular analysis was employed to obtain the result of the study. The reference year of the study was agricultural year 2014-15. For computation of costs and returns, the concept framed by CACP was used.

Cost $A_1$ = Expenditure on casual labour, bullock labour, farm machinery, seeds, fertilizer and manure, plant protection chemicals irrigation, interest on working capital + depreciation + land revenue and miscellaneous expenditure (cost of transportation, baskets and ropes).

$CostA_2$ = $CostA_1$ + rent paid for leased-in land.

$CostB_1$ = $CostA_1$ + interest on value of owned fixed capital excluding land.

$CostB_2$ = $CostB_1$ + rental value of owned land (net of land revenue) + rent paid for leased-in land.

$CostC_1$ = $CostB_1$ + imputed value of family labour.

$CostC_2$ = $CostB_2$ + imputed value of family labour.

Cost $C_3$= Cost $C_2$ +10 percent of cost $C_2$ on account of managerial function performed by the farmer.

## RESULT AND DISCUSSION

The table 1 displays distribution of farm households to different size categories e.g., marginal, small, semi-medium, medium and large in different blocks and Lalitpur district as a whole. In the district as a whole out of 300 farm households growing blackgram 62 & 78 number of households belonged to marginal and small size categories respectively. In semi-medium, medium and large size categories 86, 45 and 29 number of households existed respectively.

### Cost concept for blackgram cultivation

Size category wise cost of cultivation per hectare of blackgram according to cost concept is furnished in table 2. In cost $A_1$, cost of casual/hired labour was found to increase across the higher size categories. Dependence on hired human labour was more in higher size category than the lower size category of farms. Depreciation charge was also found to be larger in higher size category than in lower size category. Similarly cost $A_1$ per hectare was noted to increase across the higher size categories. This ranged from Rs. 12831 to Rs. 15284. Irrespective of the size categories cost $A_1$ per hectare was Rs. 14831. There was no incidence of leasing-in land by the medium and large size categories of farms. Rent paid for leased-in land was highest in semi-medium size category because of its largest amount of leased-in land. Irrespective of the size categories the rent paid for leased-in land was noted to be Rs. 1224 per hectare. Cost $A_2$ per hectare was found to be lowest in marginal size category and highest in semi-medium size category. This was Rs. 18054 which was mainly attributed to the highest level of rent paid for leased-in land. However, irrespective of the size categories cost $A_2$ per hectare was noted to be Rs. 16055. Cost $B_1$ per hectare was also found to be lowest in marginal category and highest in large size category. These were Rs. 13387 and 15843 respectively. A similarity was found in the relative positions of different size categories of farms in respect of cost $A_1$ and cost $B_1$. Irrespective of size categories cost $B_1$ per hectare was Rs. 15413. But cost $B_2$ per hectare was also observed lowest in small size category of farms but highest in semi-medium size category of farms. Irrespective of the size categories this was noted to be Rs. 22928 per hectare. Cost $C_1$ per hectare ranged from Rs. 17279 in marginal category to Rs. 17927 in medium size category. Irrespective of the size categories this was found to be Rs. 17739. Cost $C_2$ per hectare was lowest in large category of farms and highest in semi-medium category of farms. These were Rs. 24420 and Rs. 26231 respectively. Irrespective of the size categories this was Rs. 25254. Cost $C_3$ per hectare was observed to be lowest in large size category because of nonexistence of rent paid for leased-in land and low machinery cost. This was highest in semi-medium size category due to the highest amount of rent paid for leased-in land. These were Rs. 26862 and Rs. 28855 respectively. Irrespective of the size categories this was found to be Rs. 27779. Relative positions of different size categories of farms in respect of cost $C_2$ per hectare were observed to be the same as that in respect of cost $C_3$ per hectare. Similar finding were obtained by Hedge *et al.* (2013) and Khorne *et al.* (2014).

**Table 1.** Category wise sample farms growing blackgram under Lalitpur district.

| Size Categories | Maharauni Block | Bar Block | Birdha Block | Jakhaura Block | Total Size of Sample |
|---|---|---|---|---|---|
| Marginal | 20 | 16 | 11 | 15 | 62 |
| Small | 19 | 22 | 17 | 20 | 78 |
| Semi-medium | 20 | 18 | 25 | 23 | 86 |
| Medium | 11 | 13 | 12 | 9 | 45 |
| Large | 5 | 6 | 10 | 8 | 29 |
| All farms | 75 | 75 | 75 | 75 | 300 |

**Table 2. Per hectare cost of cultivation of blackgram on sample farms under study according to cost concept**(Rs./ha.).

| **Particulars** | **Marginal** | **Small** | **Semi-medium** | **Medium** | **Large** | **All Farms** |
|---|---|---|---|---|---|---|
| **Cost -$A_1$** | | | | | | |
| Casual Labour | 1784.61 | 2220.49 | 3292.42 | 3840.31 | 4334.38 | 3607.16 |
| Farm Machinery | 4199.06 | 3948.72 | 3791.74 | 3556.67 | 3270.78 | 3588.24 |
| Seed | 1189.13 | 1131.39 | 1118.63 | 1102.19 | 1082.96 | 1106.42 |
| Fertilizer | 1801.54 | 1847.88 | 1879.13 | 1829.76 | 1866.12 | 1855.05 |
| Plant protection chemicals | 1150.26 | 1204.26 | 1239.41 | 1302.09 | 1285.57 | 1264.25 |
| Interest on working capital | 881.37 | 866.02 | 859.50 | 852.66 | 823.74 | 847.31 |
| Depreciation charges | 1052.09 | 1806.07 | 1949.20 | 2198.01 | 2314.15 | 2087.74 |
| Land revenue | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| Miscellaneous expenditure | 672.60 | 510.46 | 445.25 | 420.30 | 206.40 | 374.91 |
| Total Cost- $A_1$ | 12830.66 | 13335.29 | 14675.28 | 15201.99 | 15284.10 | 14831.08 |
| **Cost -$A_2$** | | | | | | |
| Cost -$A_1$ | 12830.66 | 13335.29 | 14675.28 | 15201.99 | 15284.10 | 14831.08 |
| Rent paid for leased-in land | 2243.59 | 2690.00 | 3378.71 | 0.00 | 0.00 | 1224.04 |
| Total Cost- $A_2$ | 15074.25 | 16325.29 | 18053.99 | 15201.99 | 15284.10 | 16055.12 |
| **Cost -$B_1$** | | | | | | |
| Cost -$A_1$ | 12830.66 | 13335.29 | 14675.28 | 15201.99 | 15284.10 | 14831.01 |
| Imputed interest on fixed capital (excluding land) | 556.05 | 607.18 | 625.30 | 564.89 | 558.51 | 582.16 |
| Total Cost- $B_1$ | 13386.71 | 14242.47 | 15300.58 | 15766.88 | 15842.61 | 15413.24 |
| **Cost -$B_2$** | | | | | | |
| Cost -$B_1$ | 13386.71 | 14242.47 | 15300.58 | 15766.88 | 15842.61 | 15413.24 |
| Imputed rental value of owned land | 5871.78 | 5523.55 | 4993.80 | 7116.90 | 6894.34 | 6290.86 |
| Rent paid for leased-in land | 2243.59 | 2690.00 | 3378.71 | 0.00 | 0.00 | 1224.04 |
| Total Cost- $B_2$ | 21502.08 | 22456.02 | 23673.09 | 22883.78 | 22736.95 | 22928.14 |
| **Cost-$C_1$** | | | | | | |
| Cost -$B_1$ | 13386.71 | 14242.47 | 15300.58 | 15766.88 | 15842.61 | 15413.24 |
| Family labour | 3892.31 | 3570.42 | 2558.40 | 2159.69 | 1682.77 | 2325.77 |
| Total Cost- $C_1$ | 17279.02 | 17812.89 | 17858.98 | 17926.57 | 17525.38 | 17738.98 |
| **Cost -$C_2$** | | | | | | |
| Cost -$B_2$ | 21502.08 | 22456.02 | 23673.09 | 22883.78 | 22736.95 | 22928.14 |
| Family labour | 3892.31 | 3570.42 | 2558.40 | 2159.69 | 1682.77 | 2325.77 |
| Total Cost -$C_2$ | 25394.39 | 26026.44 | 26231.49 | 25043.47 | 24419.72 | 25253.91 |
| **Cost-$C_3$** | | | | | | |
| Cost -$C_2$ | 25394.39 | 26026.44 | 26231.49 | 25043.47 | 24419.72 | 25253.91 |
| Managerial Cost (10 % of Cost-$C_2$) | 2539.44 | 2602.64 | 2623.15 | 2666.47 | 2635.66 | 2633.11 |
| Total Cost-$C_3$ | 27933.83 | 28629.08 | 28854.64 | 27547.82 | 26861.69 | 27779.31 |

## Yields, Gross return and Net returns over various costs

Yields, gross return and net returns over various costs (based on cost concept) are presented in table 3. In case of yield of the crop both main product and by-product were taken into consideration. Main product which is pulse grain was found to range from 9.30 qtl./ha. in large category of farms to 9.52 qtl./ha. in medium category of farms. Yield of pulse grain (main product) was found to decline across the higher size categories of farms. This was attributed mainly to management problems

**Table 3.**Yields, Gross returns and Net returns over various costs (based on cost concept) in blackgram cultivation of farmers under different size categories.

| Particulars | Marginal | Small | Semi-medium | medium | Large | All Farms |
|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| **Yield (qtl./ha.)** | | | | | | |
| **Main product** | **9.52** | **9.40** | **9.38** | **9.35** | **9.30** | **9.35** |
| **value of main product (Rs./ha.)** | **41749.77** | **41275.85** | **40701.23** | **40681.61** | **39395.92** | **40354.04** |
| **By-product** | **24.29** | **24.08** | **23.86** | **23.65** | **23.18** | **23.62** |
| **Value of by-product (Rs./ha.)** | **1214.50** | **1204.00** | **1193.00** | **1182.50** | **1159.00** | **1181.00** |
| **Gross return (Rs./ha)** | **42964.27** | **42479.85** | **41894.23** | **41864.11** | **40554.92** | **41535.04** |
| **Net return over cost (Rs./ha)** | | | | | | |
| **$A_1$** | **30133.61** | **29144.59** | **27218.95** | **26662.12** | **25270.82** | **26703.96** |
| **$A_2$** | **27890.02** | **26154.59** | **23840.24** | **26662.12** | **25270.82** | **25479.92** |
| **$B_1$** | **29577.56** | **28237.41** | **26593.65** | **26097.23** | **24712.31** | **26121.80** |
| **$B_2$** | **21462.19** | **20023.86** | **18221.14** | **18980.33** | **17817.97** | **18606.90** |
| **$C_1$** | **25685.25** | **24666.99** | **24035.25** | **23937.54** | **23029.54** | **23796.06** |
| **$C_2$** | **17569.88** | **16453.44** | **15662.74** | **16820.64** | **16135.20** | **16281.13** |
| **$C_3$** | **15030.44** | **13850.80** | **13039.59** | **14316.29** | **13693.23** | **13755.73** |
| **Benefit Cost Ratio** | | | | | | |
| **$A_1$** | **3.35** | **3.18** | **2.85** | **2.75** | **2.65** | **2.80** |
| **$A_2$** | **2.85** | **2.60** | **2.32** | **2.75** | **2.65** | **2.59** |
| **$B_1$** | **3.21** | **2.98** | **2.74** | **2.65** | **2.56** | **2.69** |
| **$B_2$** | **2.00** | **1.89** | **1.77** | **1.83** | **1.78** | **1.81** |
| **$C_1$** | **2.49** | **2.38** | **2.35** | **2.33** | **2.31** | **2.34** |
| **$C_2$** | **1.69** | **1.63** | **1.60** | **1.67** | **1.66** | **1.64** |
| **$C_3$** | **1.54** | **1.48** | **1.45** | **1.52** | **1.51** | **1.49** |

of large farms. No wide disparity was noted in the yield of grain of this crop grown by different categories of farms. Irrespective of the size categories of the farms, grain of blackgram was noted to be 9.35 quintal per hectare. Also there was no wide difference in the quantity of by-product which consisted of pod without grain and plant (shrubs) in different categories of farms. This was lowest in large category of farms, which was 23.18 quintal per hectare and highest in marginal category of farms, which was 24.29 quintal per hectare. By-product was also found to decline across the higher size categories of farms. Value of main product (pulse grain) was noted be highest in marginal category and lowest in large category of farms. These were Rs. 41750 and Rs. 39396 per hectare. Value of main product (pulse grain) was also found to decline across the higher size categories of farms. This was caused mainly by declining yield across the higher size categories of farms. Irrespective of the size categories value of main product was noted to be Rs. 40354 per hectare. Similar picture was visualized in case of the value of by-product, which ranged from Rs. 1214 to Rs. 1159. Irrespective of the size categories this was observed to be Rs. 1181 per hectare. Gross return which included value of main product and by-product was also found to decline across the higher size categories of farms. Irrespective of size categories gross income per hectare was observed to be Rs. 41535.

The table 3 also displays net return over different costs based on cost concept. Net return over cost $A_1$, cost $B_1$ and cost $C_1$ were found to decline across the higher size categories of farms. Irrespective of the size categories these net returns were noted to be Rs. 26704 per hectare, Rs. 26122 per hectare and Rs. 23797 per hectare respectively. On the other hand, no such trend was found in case of net incomes over cost $A_2$, cost $B_2$, cost $C_2$ and Cost $C_3$. But in each of these cases net return was observed to be highest in marginal size category of farms. Irrespective of the size categories these were noted to be Rs. 25480 per hectare, Rs. 18607 per hectare, Rs. 16281 per hectare and Rs. 13756 respectively.

Benefit cost ratio was also presented in this table. Benefit cost ratio over cost $A_1$ was found to decline across the higher size categories. This was attributed to decreasing gross return and increasing cost across the higher size categories (table 2 and table 3). In marginal size category it was noted to be 3.35 and 2.65 in large size category of farms. Irrespective of the size categories benefit cost ratio over cost $A_2$ was also highest in marginal category and lowest benefit cost ratio was estimated in semi-medium size category. It was noted to be 2.85 and 2.32 respectively. This was consistent with per hectare cost $A_2$ of different size categories of farms (table 2). Irrespective of the size categories this was noted to be 2.59. Benefit cost ratio over cost $B_1$ was found to decline across the higher size categories of farms which can be explained in terms of decreasing gross return and increasing cost across the higher size categories of farms. The highest and lowest benefit cost ratios were estimated to be 3.21 and 2.56 respectively. Irrespective of the size categories this was noted to be 2.69. Benefit cost ratio over cost $B_2$ was found to be highest in marginal category and lowest benefit cost

**Table 4.** Per hectare cost and return of blackgram on sample farms under study(in Rs.).

| S.N. | Particulars | Marginal | Small | Semi-medium | Medium | Large | All farms |
|---|---|---|---|---|---|---|---|
| 1. | **Cost** | | | | | | |
| | **Variable cost** | 15570.88 (55.74) | 15299.64 (53.44) | 15184.48 (52.62) | 15063.67 (54.68) | 14552.72 (54.18) | 14969.11 (53.89) |
| | **Fixed cost** | 9823.51 (35.17) | 10726.80 (37.47) | 11047.01 (38.29) | 9979.80 (36.23) | 9867.00 (36.73) | 10284.80 (37.02) |
| | **Managerial cost** | 2539.44 (9.09) | 2602.64 (9.09) | 2623.15 (9.09) | 2504.35 (9.09) | 2441.97 (9.09) | 2525.40 (9.09) |
| | **Total cost** | 27933.83 (100.00) | 28629.08 (100.00) | 28854.64 (100.00) | 27547.82 (100.00) | 26861.69 (100.00) | 27779.31 (100.00) |
| 2. | **Return** | | | | | | |
| | **Gross return** | 42964.27 | 42479.85 | 41894.23 | 41864.11 | 40554.92 | 41535.04 |
| | **Net return** | 15030.44 | 13850.80 | 13039.59 | 14316.29 | 13693.23 | 13755.73 |
| | **B. C. Ratio** | 1.54 | 1.48 | 1.45 | 1.52 | 1.51 | 1.49 |

Figures in parentheses indicate the percentages to the total cost.

ratio was estimated for semi-medium size category. These were noted to be 2.00 and 1.77 respectively. These can also be explained in terms of per hectare cost $B_2$ of different size categories of farms (table 2). Irrespective of the size categories this was observed to be 1.81. Benefit cost ratio over cost $C_1$ was found to decline across the higher size categories. This pattern of benefit cost ratio over cost $C_1$ was not consistent with the pattern of distribution of per hectare cost $C_1$. Distribution pattern of per hectare gross return (table 3) to different size categories of farms was noted to influence the benefit cost ratios over cost $C_1$ of different size categories of farms. Here the highest and lowest benefit cost ratios were estimated to be 2.49 and 2.31 respectively. Irrespective of the size categories this was noted to be 2.34. Benefit cost ratios over cost $C_2$ were found to be highest in marginal size category and lowest in semi-medium size category. These were 1.69 and 1.60. However, irrespective of size categories, this was noted to be 1.64. Here per hectare cost $C_2$ and per hectare gross return moves in different ways. Effect of per hectare cost $C_2$ in influencing the lowest benefit cost was more than that of per hectare gross return. But the effect of per hectare gross return in determining the highest benefit cost ratio was more than that of per hectare cost $C_2$. Irrespective of the size categories benefit cost ratio was noted to be 1.64. Benefit cost ratio over cost $C_3$ was found to decline across the higher size categories of farms. The highest and lowest benefit cost ratios were found to be 1.54 and 1.45 respectively. This can be attributed to declining gross return per hectare across the higher size categories of farms. However, irrespective of the size categories this was observed to be 1.49. It can be concluded from the above description that benefit cost ratios over different cost concepts were invariably highest in marginal size category of farms than any other categories of farms in the study.

## Cost and return structure of blackgram production

Cost and returns of blackgram grown by different categories of farms are displayed in table 4. These costs were related to cost structure. These were variable cost, fixed cost and managerial cost. Variable cost was found to decline across the higher size categories and these ranged from Rs. 15571 per hectare to Rs. 14553 per hectare. Irrespective of size categories this was noted to be Rs. 14969 per hectare. Fixed cost was found to be highest in semi-medium size category and lowest in marginal size category of farms. Irrespective of the size categories fixed cost was noted to be Rs. 10285 per hectare. Percentage shares of variable costs were found to be higher than those of fixed costs in all of the size categories of farms. Managerial cost which depends on both variable and fixed cost was found to be highest in semi-medium and lowest in large category of farms. These were Rs. 2603 per hectare. Irrespective of the size categories this was noted to be Rs. 2525 per hectare. Cost of cultivation of blackgram was noted to be highest in semi-medium size category and lowest cost was estimated in large size category. These were Rs. 28855 per hectare and Rs. 26862 per hectare respectively. Difference in costs between small and semi-medium categories of farms was negligible. Similarly no wide difference was there between the costs of marginal and medium size categories. Irrespective of the size categories this cost was found to be Rs. 27779 per hectare. Gross return was noted to decline across the higher size categories of farms. The highest and lowest gross returns were found to be Rs. 42964 per hectare and Rs. 40555 per hectare respectively. A negligible difference in gross returns was noted between medium and semi-medium size categories. Irrespective of the size categories this was observed to be Rs. 41535 per hectare. So far net return was concerned it was noted to be highest in marginal category and lowest in semi-medium category. These were observed to be Rs. 15030 per hectare and Rs. 13040 per hectare respectively. Irrespective of the size categories this was noted to be Rs. 13756 per hectare.

Benefit-cost ratio was found to be highest in marginal size category and lowest in semi-medium category. This ranged from 1.48 to 1.54. Irrespective of the size categories this noted to be 1.49. Similar result was observed by Kumar, *et al.* (2013).

## CONCLUSION

Measurement of efficiency in farm economics is based on cost and return analysis. In this study cost and return analysis were carried out in respect of blackgram grown by different size classes of farms. Estimated gross return, net return per unit area and benefit cost ratio of different size categories of farms indicated that marginal farmers utilized their resources more efficiently than any other size category of farms. A large number of farmers were reportedly engaged in the cultivation of this crop. A portion of agricultural income was found to be accrued from growing this crop. In many cases, as expressed by them, they failed to get remunerative price for this crop. An efficient marketing system was necessary for making this crop more remunerative. This study also called for dissemination of improved package of practice in the farming communityfor growing this crop more efficiently.

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